

CASE STUDY REPORT #83
MOJAVE FORKS RESERVOIR
MOJAVE RIVER

I. Project Description

The Mojave River drainage is in the Mojave Desert of east-central Southern California. The river originates in the foothills of the San Bernardino Mountains and it terminates in Silver Lake which occasionally receives the river's flood waters (see Figure 1). The Mojave Forks Project, located at the junction of West Fork and Deep Creek, has a drainage area of 215 square miles. The average annual rainfall is 40 inches in the higher elevations while the lower reach receives less than 4 inches.

The U. S. Army Corps of Engineers completed the Mojave Forks Project in 1971. The reservoir stores a maximum of 89,700 acre-feet covering 1980 acres and is operated for flood control. The outlet of the dam is ungated and discharges up to 23,000 cfs, which is the maximum streamflow capacity of the river channel.

The inflow to the reservoir is influenced by Lake Arrowhead on the Deep Creek tributary

II. Pre-Project Condition

Natural streamflows at the confluence of Deep Creek and West Fork have peak discharges of short duration during the wet season (a maximum discharge of 48,000 cfs was recorded in March of 1938). Sixty percent of the precipitation and runoff occurs from December to March. During the dry season in most years, the Mojave River is dry (see Figure 2).

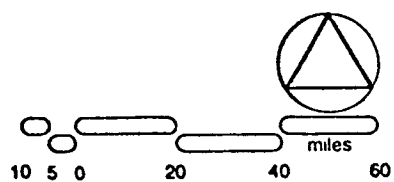
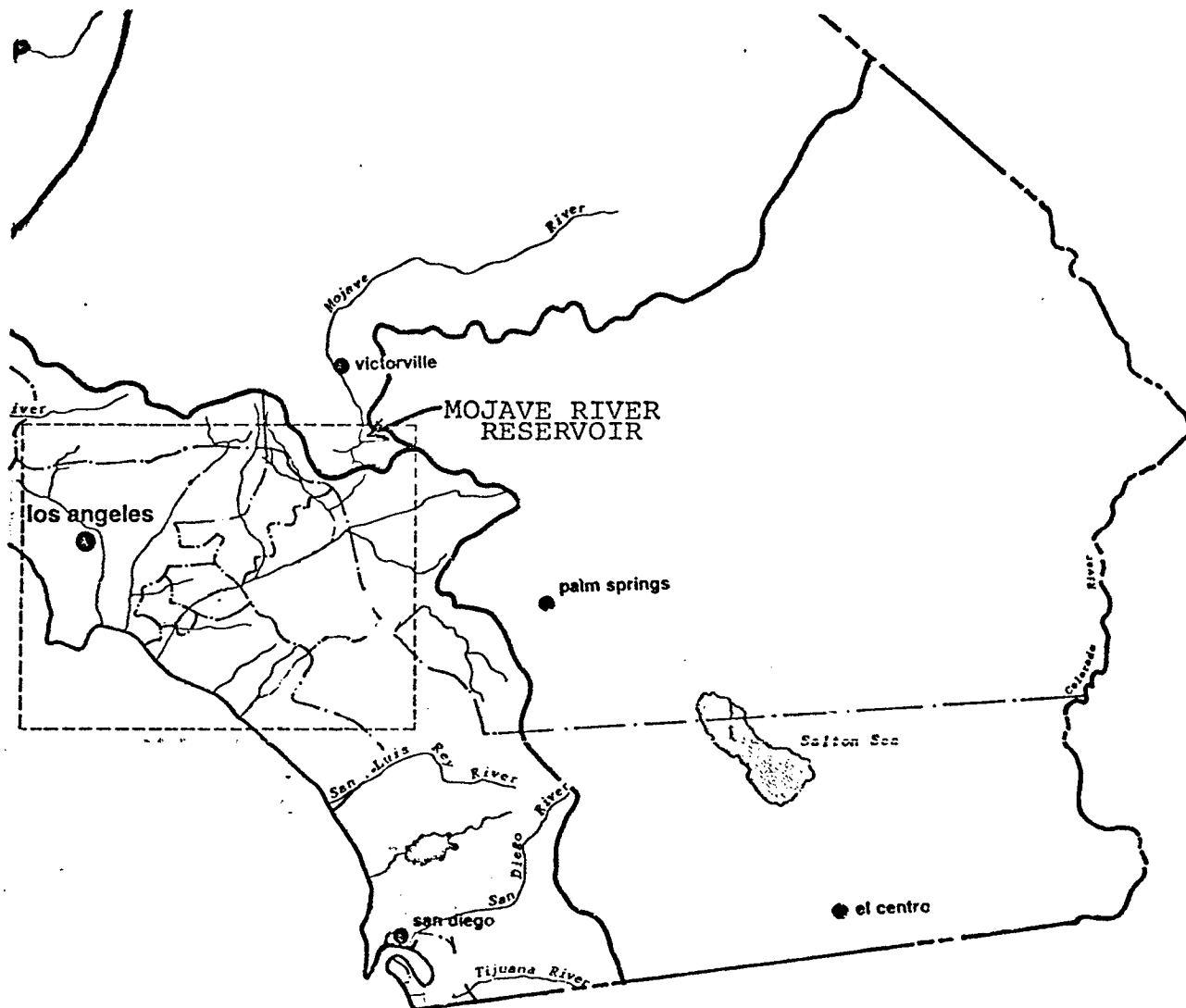


Figure 1
LOCATION MAP

Source: U. S. Army Corps of Engineers, 1975.

576 STREAMFLOW (CFS)

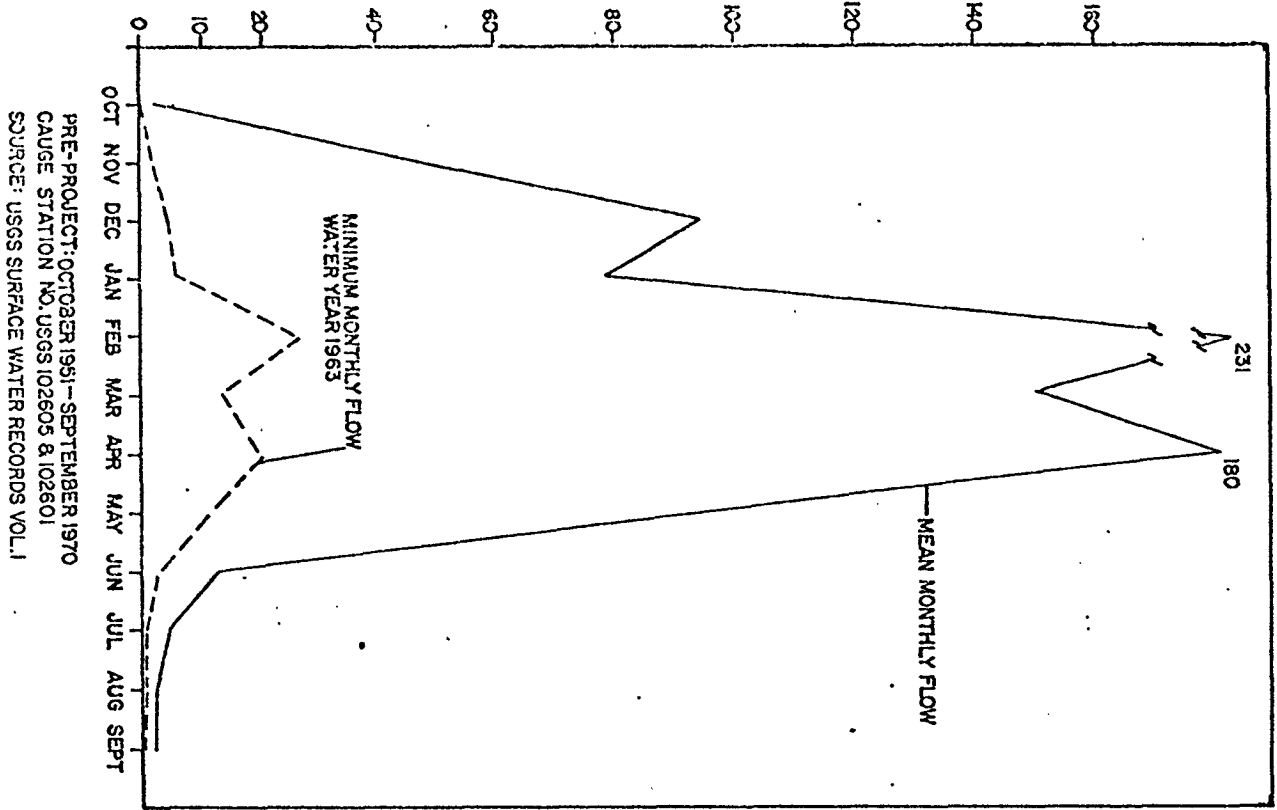
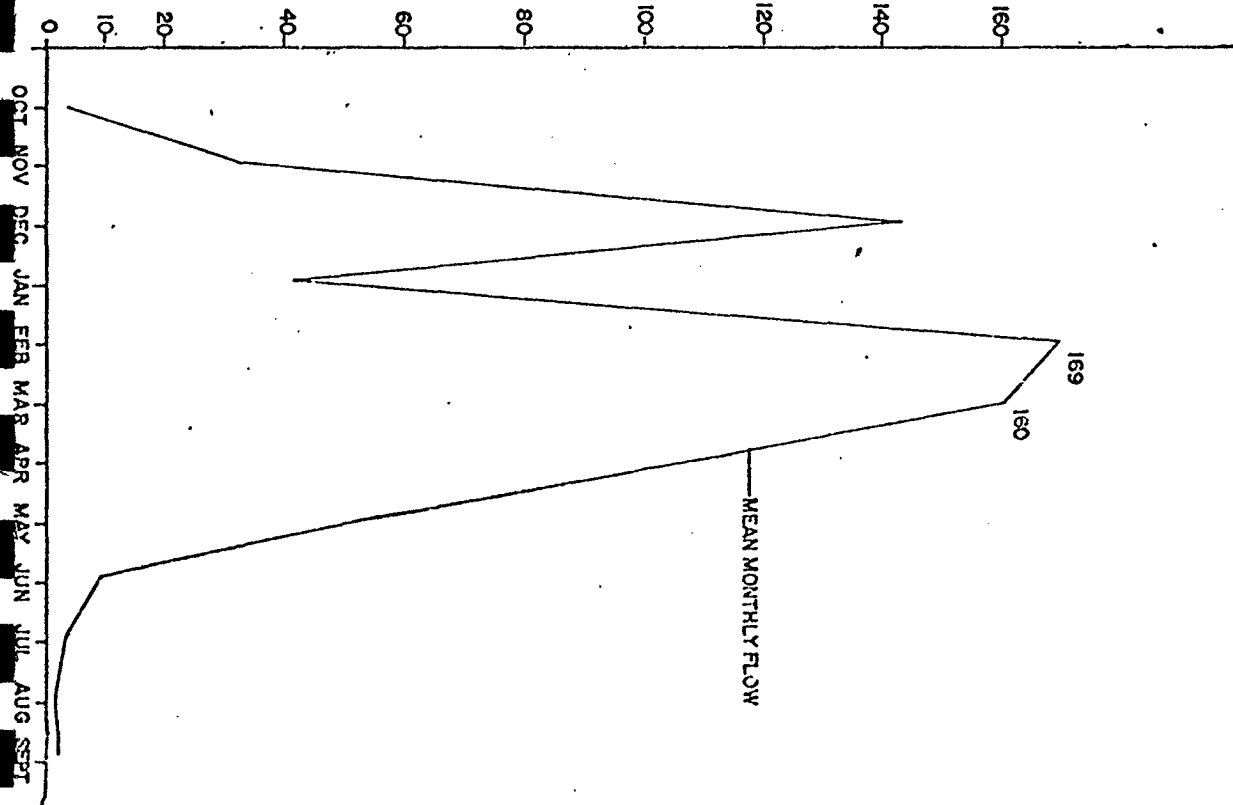


FIGURE 2
STREAMFLOW CONDITIONS, MOJAVE RIVER
MOJAVE FORKS RESERVOIR

PRE-PROJECT: OCTOBER 1951 - SEPTEMBER 1970
GAUGE STATION NO. USGS 102605 & 102601
SOURCE: USGS SURFACE WATER RECORDS VOL. I

STREAMFLOW (CFS)



POST-PROJECT: OCTOBER 1971 - SEPTEMBER 1973
GAUGE STATION NO. USGS 1026100
SOURCE: USGS SURFACE WATER RECORDS VOL. I

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The intermittent nature of the streamflow precludes the development of any natural game fish populations. There are small cyprinids present in the Mojave River. At one time the Mojave chub (Gila mohavensis) was found at the junction of West Fork and Deep Creek downstream to Soda Lake. The population of this species was reduced through hybridization with a related species of chub (Gila orcutti) illegally introduced into the river. The DFG considered the chub an endangered species prior to the completion of the Mojave project in 1971 (DFG, 1971). At that time most populations were confined to Lake Tuendae and nearby springs at the lower reach of the river.

Along the upper reach of the Mojave River the DFG operates a rainbow trout hatchery that receives its water supply from wells. There are also private hatcheries in the area which operate on wells producing water at a temperature of 60°F. This is near the upper temperature tolerance limit for rainbow trout.

III. Project Development

The U.S. Army Corps of Engineers and the U.S. Bureau of Reclamation considered proposals for multipurpose (flood control) projects at the Mojave Forks area. Authorization of funding for a single purpose flood control project was issued by Congress in 1966.

The Resources agency transmitted its comments on the different project alternatives and plans to the U.S. Bureau of Reclamation

and the U.S. Corps of Engineers in 1965. The preliminary comments of the DFG were also included at this time. Some major concerns of the DFG and the U.S. Fish and Wildlife Service were expressed in correspondence during this initial stage of development. One concern was the impact of the project upon the groundwater temperature. It was felt that the dam's effect on subsurface flows in Deep Creek and the heating of water in the reservoir could cause a slight increase in groundwater temperatures at the Mojave trout hatchery and result in reduced trout production. The U.S. Army Corps of Engineers determined that the presence of an ungated outlet at the dam and the size of the groundwater reservoir would prevent adverse effects on temperature.

Concern over some of the flood plain management alternatives was expressed by both DFG and U.S. Fish and Wildlife Service. Some proposed plans called for the removal of phreatophytes along the lower river channel. The destruction of this riparian habitat in the desert environment would adversely affect wildlife in the area. These plans were never fully adopted in the final Mojave project.

IV. Post-Project

The operation of Mojave Forks Reservoir has reduced the peak flood flows that were common during the desert wet season. It appears the operation of the dam has not significantly affected the subsurface flow of the river or the temperature of the groundwater in the vicinity of the Mojave Hatchery (Richardson, pers. comm.)

The streamflow is still intermittent in character and does not support any large fish population. The Mojave chub has been transplanted a number of places and is presently listed as endangered by the DFG (1974).

V. Conclusions

The operation of Mojave Forks as a single purpose flood control dam with an ungated outlet did not significantly alter the mean monthly streamflow of the Mojave River (see Figure 2). Peak stream discharges are reduced by storage at the dam for gradual release at a later time.

There were no studies to determine instream flow needs for fish and wildlife. However, both the DFG and the U.S. Fish and Wildlife Service considered possible adverse effects due to the removal of phreatophytes and the recharging of the groundwater with high temperature water. The single purpose project alternative (flood control) did not have any adverse effects while the multipurpose project alternative, which was not approved, may have caused detrimental effects in the Mojave River area.

The intermittent nature of streamflow during pre-project conditions had precluded the development of any significant fishery resource in the project area. As a result instream flow needs for fishlife were not considered during pre-project investigations.

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Personal Communications

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